

DETECTING THE EFFECTS OF CHOLESTEROL AND OTHER STEROLS ON AGGREGATION OF LIPIDS IN THE PULMONARY SURFACTANT LAYER USING FIELD-INDUCED DROPLET IONIZATION MASS SPECTROMETRY, [Tony Z. Jia](#), J. L. Beauchamp*, California Institute of Technology, Pasadena, CA 91125, Department of Chemistry and Chemical Engineering. jlbeauchamp@caltech.edu

Field-induced droplet ionization (FIDI) mass spectrometry is a useful application for studying the chemical reactions at the gas-liquid interface by preferentially sampling ions from the surface of small droplets. FIDI subjects a droplet to a strong electric field which causes the droplet to elongate and emit jets of opposite charge, generating desolvated gas-phase ions; these are sampled by an ion trap mass spectrometer for analysis. Recent research has pointed to cell membranes as being composed of complex lipid domains including lipid rafts, as opposed to a homogeneous fluid. Segregation of membrane lipids is affected by sterols, most notably cholesterol. This study utilizes FIDI-MS to examine the structure of mixed pulmonary surfactant lipid layers with varying amounts of sterols including cholesterol and sphingomyelin. More than 90% of the pulmonary surfactant layer is made of lipids, and thus by examining these interactions, we may gain more insight into lung function. This study also includes basic studies of the mechanism of FIDI-MS by comparing FIDI spectra to electrospray ionization mass spectra of samples containing species with different surface activities. The data obtained suggest that FIDI does indeed sample preferentially from the surface.

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